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Title: Regular Polygons – The transformation approach

Summary:

Basic facts about regular polygons, and the notion of regularity, are well known since the beginning of 70's of last century. Starting with the theorem about a spatial regular pentagon being planar (Van der Waerden, 1970), a whole theory has been built up, mainly in the n-dimensional Euclidean space. Total regularity implies a nice behaviour of the k-gon, depending on the parity of k. Via different models and techniques, similar theorems on properties and classifications were discovered, then rediscovered independently. The very elementary geometric question whether a regular $(n+1)$-gon spans the n-dimensional space, and under what conditions, drew the attention of geometers again and again during last four decades. The same theorems were discovered several times independently, in different interpretations. In an early article, Gabor Korchmaros used geometric transformations to solve the problem completely in three-dimensional spaces. The method is of absolute character, so the result is valid not only in Euclidean space but in absolute geometry, as well. Our efforts for generalizing these results for higher dimensional spaces, lead to some results, already known, however the transformation technics would help us to understand and retrieve the deeper geometric relations.